

WOODLAND SUITABILITY GROUPS
2X1

Glade communities found along escarpments or exposed rock formations. The soils are well drained. Slopes range from 3 to 60 percent. Soil depth is very shallow to shallow (6 to 20 inches). Surface often with massive areas of exposed bedrock and scattered rock fragments and boulders.

Vegetation: Mid-grass with scattered woody vegetation such as eastern red cedar, blackjack oak, chinquapin oak, and winged elm.

Soil Series: Moko

Limitations: Surface stones and surface rock; soil depth; slope.

Interpretations:

Equipment Surface stones and rocks are problems for efficient Use and safe equipment operation.

Planting Severe seedling mortality due to high soil surface temperatures and low available water holding capacity.

Machine planting is not recommended.

Site Mechanical site preparation is not recommended.
Preparation Surface stones and rocks will make equipment use extremely difficult.

Slope Erosion is a hazard when slopes exceed 15 percent.
On steep slopes, traction problems increase. Track type equipment or yarding with cables may be necessary.

Management: Site index values are less than 40. Productivity is very low. Limited woodland management opportunities exist. These sites can be valuable for wildlife purposes and watershed protection.

Trees to Plant: Eastern red cedar

WOODLAND SUITABILITY GROUPS
2X2

Xeric forest communities found along ridgetops, bluff escarpments, and steep slopes with exposed rock formations. The soils are somewhat excessively drained. Slopes range from 2 to 50 percent. Soil depth is very shallow to shallow (4 to 20 inches). Surface often with areas of exposed bedrock, scattered rock fragments, and boulders.

Vegetation: Oak-cedar or oak forests with chinquapin oak, post oak, and eastern red cedar. Pure stands of red cedar may occur in some areas.

Soil Series: Gasconade, stony
Basehor, stony

Limitations: Surface stones and surface rock; soil depth; slope.

Interpretations:

Equipment Surface stones and rocks are problems for efficient Use and safe equipment operation.

Planting Severe seedling mortality due to high soil surface temperatures and low available water holding capacity. Machine planting is not recommended.

Site Preparation Mechanical site preparation is not recommended. Surface stones and rocks will make equipment use extremely difficult.

Slope Erosion is a hazard when slopes exceed 15 percent. On steep slopes, traction problems increase. Track type equipment or yarding with cables may be necessary.

Management: Site index values are less than 40. Productivity is low. Limited woodland management opportunities exist. Eastern red cedar production may be possible on sites with deeper soil depths. These sites can be valuable for wildlife purposes and watershed protection.

Trees to Plant: Eastern red cedar

WOODLAND SUITABILITY GROUPS
2-5 X3

Dry forest communities found on moderately steep mid and upper slopes of hills, plains, crests of bluffs, and steep walled valleys or canyons. Surface stones common. The soils are moderately well drained to somewhat excessively drained. Slopes range from 5 to 60 percent. Soil depths predominately 20 to 40 inches.

Vegetation: Oak-hickory and oak-pine forests with white oak, black oak, post oak, pignut hickory, chinquapin oak, and eastern red cedar. In southern sections of the Ozarks, shortleaf pine and scarlet oak occur.

Soil Series:

Bender, stony	Knobtop, stony
Bolivar, stony	Snead, stony
Caneyville, stony	Snead, flaggy
Delassus, bouldery	Beemont, stony
Gatewood, stony	
Irondale	

Limitations: Surface stones; soil depth; slope.

Interpretations:

Equipment Use Surface stones are problems for efficient and safe equipment operation. Stones on the surface cause breakage of timber and hinders yarding.

Planting Mechanical tree planting will be limited. Hand planting or direct seeding may be necessary. Seedling mortality due to low available water capacity may be high. Mulching or providing shade can improve seedling survival.

Site Preparation Mechanical site preparation is not recommended. Surface stones will make equipment use extremely difficult.

Slope Erosion is a hazard when slopes exceed 15 percent. On steep slopes, traction problems increase. Track type equipment or yarding with cables may be necessary.

Management: Site index values range from 40 to 60. Woodland mangement opportunities are fair to good. These groups respond well to even-aged managment. Restrict clear cuttings to less than 30 acres or group selection cuttings of 2 to 5 acres. Favor oaks on higher productivity sites and pines and cedars on lower porductivity sites.

Trees to Plant:

White oak	Shortleaf pine
Black oak	Eastern red cedar

WOODLAND SUITABILITY GROUPS
3-4 X5

Dry-mesic forest communities found on gentle to steep upper and mid-slopes of hills, ridges, plains, and foot slopes of mountain domes. Surface stones common. The soils are moderately well drained to somewhat excessively drained. Slopes range from 1 to 70 percent. Soil depths generally exceed 60 inches. Includes some shallower soils on north facing slopes.

Vegetation: Oak-hickory, mixed deciduous, or oak-pine forests with white oak, northern red oak, black oak, shagbark hickory, mockernut hickory, and sugar maple. In the southern Ozark region, shortleaf pine and black gum are common associates.

Soil Series: Alsup, stony Gepp, stony Ocie, stony
Caneyville, stony Goss, stony
Clarksville, stony Killarney
Doniphan, stony Mano, stony

Limitations: Surface stones; slope.

Interpretations:

<u>Equipment Use</u>	Surface stones are problems for efficient and safe equipment operation. As slope gradients increase traction problems increase. Stones on the surface cause breakage of timber and hinders yarding.
<u>Planting</u>	Mechanical tree planting will be limited. Hand planting or direct seeding may be necessary. Seedling mortality due to low available water capacity may be high. Mulching or providing shade can improve seedling survival.
<u>Site Preparation</u>	Mechanical site preparation is not recommended. Surface stones will make equipment use extremely difficult.
<u>Slope</u>	Erosion is a hazard when slopes exceed 15 percent. On steep slopes, traction problems increase. Track type equipment or yarding with cables may be necessary.

Management: Site index values range from 55 to 74. Woodland management opportunities are good. These groups respond well to even-aged management. Restrict clearcuttings to less than 30 acres or group selection cuttings of 2 to 5 acres. Favor white oak and northern red oak on higher productivity sites and black oak and pines on lower productivity sites.

Trees to Plant: White oak Shortleaf pine
Black oak Yellow poplar
Northern red oak

WOODLAND SUITABILITY GROUPS
2-4 W4

Flatwood forest communities found on level or nearly level plains, ridges, terraces, and small plateaus. Soils are poorly drained to somewhat poorly drained with an impermeable or slowly permeable subsurface layer. Perched water tables occur from 0 to 2 feet. Slopes range from 0 to 5 percent. Soil depths exceed 60 inches. Includes upland natric soils.

Vegetation: Oak flatwood communities with post oak, blackjack oak, black oak, pin oak, swamp white oak, and black hickory.

Soil Series:

Bado	Loughboro	Belinda
Carytown	Marion	Friendly
Chauncey	McGirk	
Lafe	Weir	

Limitations: Wetness from seasonal high water table, becoming dry in summer and fall; soil depth; sodium

Interpretations:

Equipment Use Unsurfaced roads and traffic areas tend to be slippery and form ruts easily. Graveling roads facilitates year-round use. Equipment use when wet may compact soil and damage tree roots.

Planting Planting is difficult during wet spring periods. Seedling mortality may be high due to excess wetness, shallow rooting depths or sodium. Ridging the soil and planting on the ridges may increase survival.

Site Preparation The use of equipment is restricted in spring and other excessively wet periods.

Management: Site index values range from 40 to 60. Management opportunities are fair to good. This group responds well to even-aged management. Restrict clear cuttings to less than 30 acres or group selection cuttings of 2 to 5 acres. Favor black oak, white oak, and pin oak on better sites.

Trees to Plant:

- Black oak
- Pin oak
- Sweetgum (south)

WOODLAND SUITABILITY GROUPS
4-5 W6

Mesic forest communities found on stream terraces, along stream channels, and Ozark bottomlands. The soils are moderately well drained to excessively drained. Soil profiles may be sandy or gravelly. Frequent flooding with flooding durations, brief to very brief. Slopes range from 0 to 5 percent. Soil depths exceed 60 inches.

Vegetation: Mixed deciduous forests with northern red oak, white oak, black walnut, and ash. Shortleaf pine, cherrybark oak, shumard oak, and sweetgum may occur in the southern Ozarks region.

Soil Series:	Bloomsdale	Hontas	Healing
	Cedargap	Kaintuck	Okaw
	Cleora	Midco	Sandbur
	Crevasse	Razort	Stultz

Limitations: Wetness from flooding.

Interpretations:

<u>Equipment Use</u>	Flooding frequency may limit equipment use November through May.
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<u>Planting</u>	Planting is difficult during spring flooding periods.
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<u>Site Preparation</u>	The use of equipment is restricted in spring and other excessively wet periods.
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Management: Site index values may exceed 75. These groups respond well to both even-aged and uneven-aged management. Restrict cuttings to small group cuttings of 1 to 2 acres, single-tree selections, or clear cuttings of less than 30 acres. Favor white oak, northern red oak, black walnut, and cherrybark oak. Shade tolerant understory species may need to be controlled during regeneration activities. Maintain adequate riparian buffer strips.

Trees to Plant:	White oak
	Northern red oak
	Black walnut
	Cherrybark oak (south)
	Shumard oak (south)

WOODLAND SUITABILITY GROUPS
3-4 W7

Wet-mesic forest communities found along natural levees, terraces, and level to gently sloping bottomlands. Soils are primarily very poorly drained to somewhat poorly drained. Soils are seasonally or intermittently wet for brief to long periods. Flooding is occasional to frequent. High seasonal water tables are typical. Slopes range from 0 to 5 percent. Also includes frequently flooded better drained soils.

Vegetation: Mixed deciduous forests with swamp white oak, pin oak, green ash, cottonwood, pecan, shellbark hickory, and sycamore. In the southeastern region, cherrybark oak, overcup oak, and bald cypress are common associates.

Soil Series:	Auxvasse	Dockery	McPaul	Percival	Tuskeego
	Calhoun	Gilford	Modale	Quarles	Twomile
	Coland	Gladden	Moville	Racoon	Urich
	Collins	Kickapoo	Nodaway	Tanglenook	Wardell
	Convent	Lanton	Onawa	Tunica	Muldrow
		Lightning	Orion		

Limitations: Wetness from flooding and/or high water table.

Interpretations:

Equipment Use Unsurfaced roads and traffic areas tend to be slippery and form ruts easily. Graveling roads facilitates year-round use. Equipment use when wet may compact soil and damage tree roots.

Planting Planting is very difficult during spring periods. Seedling mortality may be high due to excess wetness. Ridging the soil and planting on the ridges may increase survival.

Site Preparation The use of equipment is restricted in spring and other excessively wet periods.

Management: Site index values are generally less than 80. This group responds well to both even-aged and uneven-aged management. Restrict cuttings to small group cuttings of 1 to 2 acres, single tree selections, or clear cuttings of less than 30 acres. Favor swamp white oak, pecan, sycamore, pin oak, and cottonwood. Maintain adequate riparian buffer strips.

Trees to Plant:	Pin oak	Bald cypress	swamp white oak
	Pecan	Green ash	Cottonwood

WOODLAND SUITABILITY GROUPS
5-13 W7

Wet-mesic forest communities found along natural levees, terraces, and level to gently sloping bottomlands. Soils are primarily very poorly drained to somewhat poorly drained. Soils are seasonally or intermittently wet for brief to long periods. Flooding is occasional to frequent. High seasonal water tables are typical. Slopes range from 0 to 5 percent. Also includes frequently flooded better drained soils.

Vegetation: Mixed deciduous forests with swamp white oak, pin oak, green ash, cottonwood, pecan, shellbark hickory, and sycamore. In the southeastern region, cherrybark oak, overcup oak, and bald cypress are common associates.

Soil Series:	Acadia	Dundee	Huntington	Roellen
	Amagon	Dunning	Kobel	Sarpy
	Bremer	Falaya	Landes	Sawmill
	Bowdre	Fatima	Mhoon	Skidmore
	Blake	Forestdale	Newark	Tice
	Chequest	Fountain	Nolin	Tunica
	Commerce	Haynie	Paxico	Tuckerman
	Crowley	Houkla	Racket	Wakeland
				Wilbur

Limitations: Wetness from flooding and/or high water table.

Interpretations:

Equipment Use Unsurfaced roads and traffic areas tend to be slippery and form ruts easily. Graveling roads facilitates year-round use. Equipment use when wet may compact soil and damage tree roots.

Planting Planting is very difficult during spring periods. Seedling mortality may be high due to excess wetness. Ridging the soil and planting on the ridges may increase survival.

Site Preparation The use of equipment is restricted in spring and other excessively wet periods.

Management: Site index values may exceed 100. This group responds well to both even-aged and uneven-aged management. Restrict cuttings to small group cuttings of 1 to 2 acres, single tree selections, or clear cuttings of less than 30 acres. Favor swamp white oak, cherrybark oak, black walnut, pecan, sycamore, and cottonwood. Maintain adequate riparian buffer strips.

Trees to Plant:	Pin oak	Bald cypress	Cherrybark oak
	Pecan	Green ash	Cottonwood

WOODLAND SUITABILITY GROUPS 3-13 W8

Wet forest communities found on level bottomlands and low terraces with depressions. Frequent flooding with brief to long durations. The soils are very poorly to poorly drained with seasonal high water tables during late fall, winter and spring. Slowly permeable soil profiles are typical.

Vegetation: Mixed deciduous forests with pin oak, silver maple, cottonwood, river birch, and sycamore. In the southeastern region, bald cypress, water oak and swamp cottonwood also occur.

Soil Series:	Aholt	Calhoun	Darwin
	Albaton	Carlow	Osage
	Alligator	Foley	Piopolis
	Amagon	Gideon	Portageville
	Atkins	Hayti	Sharkey
	Baldwin	Jackport	Wabash
	Blackoak	Leta	Waverly
	Bonnie	Melvin	Zachery
	Cairo	Moniteau	

Limitations: Wetness from flooding and high water table.

Interpretations:

Equipment Use Unsurfaced roads and traffic areas tend to be slippery and form ruts easily. Access to woodlands is easiest during periods in late summer or winter when soils are frozen or dry. Equipment use when wet will compact soil and damage tree roots.

Planting Planting is extremely difficult during spring periods. Seedling mortality will be high due to excess wetness. Ridging the soil and planting on the ridges may increase survival.

Site Preparation The use of equipment is restricted in late fall, spring, and other excessively wet periods.

Management: Site index values range from 40 to greater than 80. On the wettest sites, woodland management opportunities are very limited. Management of these groups is often difficult because of the great variation in species, age, and stocking levels. Use seed-tree, group selection, or clearcutting regeneration methods. Harvest favoring reproduction of the less-shade tolerant species such as pin oak, sycamore, cottonwood, and bald cypress. Maintain adequate riparian buffer strips.

Trees to Plant:	Cottonwood	Bald cypress
	Silver maple	Sycamore
	Pin oak	Loblolly pine (south)

WOODLAND SUITABILITY GROUPS
2-8 W9

Swamp forest communities found in floodplain depressions, backwater sloughs, old stream channels, and along oxbow ponds. Soils are very poorly to poorly drained. Flooding and ponding evident. Surface water present for extended periods, sometimes becoming dry in late summer and during droughts.

Vegetation: Mixed hardwood or cypress forests with water oak, sugarberry, black willow, silver maple, water tupelo, buttonbush, river birch, swamp cottonwood, and bald cypress.

Soil Series:

Allemands	Levasy
Alligator	Myrick
Beaucoup	Otter
Booker	Portage
Darwin	Sikeston

Limitations: Wetness from flooding and ponding.

Interpretations:

Equipment Use Soils are not suitable for the use of ordinary crawler tractors or rubber-tired skidders. Special harvesting equipment is needed.

Planting Not feasible except during drought years.

Site Preparation Because of wetness, trees may be shallow rooted and subject to wind throw.

Management: Site index values range from 40 to greater than 80. Frequent flooding or permanent ponding severely restricts woodland management opportunities. Harvesting may be possible in very dry years or during winter periods when the ground or water is completely frozen. Widespread regeneration may require a prolonged dry cycle. These areas are best maintained for wildlife and water quality purposes.

Trees to Plant:

- Bald cypress
- Swamp cottonwood
- River birch

WOODLAND SUITABILITY GROUPS
2D1

Glade communities found along escarpments or exposed rock formations. The soils are well drained. Slopes range from 2 to 50 percent. Soil depth is very shallow to shallow (6 to 20 inches). Surface often with areas of exposed bedrock and scattered rock fragments.

Vegetation: Mid-grass with scattered woody vegetation such as eastern red cedar, blackjack oak, chinquapin oak, and winged elm.

Soil Series: Knobby

Limitations: Reduced rooting depth (bedrock); coarse fragments in subsurface profile; slope

Interpretations:

Equipment Use Rock outcrops may cause breakage of timber when harvesting and hinder yarding operations. Depth to bedrock presents problems when cutting and filling is required.

Planting Severe seedling survival due to shallow rooting depth and low available water holding capacity.

Site Preparation Hard bedrock at shallow depths will interfere with equipment operation.

Slope Erosion is a hazard when slopes exceed 15 percent. On steep slopes, traction problems increase. Track type equipment or yarding with cables may be necessary.

Management: Site index values are less than 40. Productivity is very low. Limited woodland management opportunities exist. These sites can be valuable for wildlife purposes and watershed protection.

Trees to Plant: Eastern red cedar

WOODLAND SUITABILITY GROUPS
2-3 D2

Xeric forest communities found along ridgetops, bluff escarpments, and steep slopes with exposed rock formations. The soils are well drained to excessively drained. Slopes range from 2 to 50 percent. Soil depth is shallow (13 to 18 inches). Scattered surface areas with exposed bedrock and rock fragments.

Vegetation: Oak-cedar or oak forests with chinquapin oak, post oak, black oak, and eastern red cedar. Pure stands of red cedar may occur in some areas.

Soil Series:

Basehor	Opequon
Hector	Ramsey
Norris	Ranacker

Limitations: Reduced rooting depth (bedrock); slope

Interpretations:

Equipment Use Rock outcrops may cause breakage of timber when harvesting and hinder yarding operations. Depth to bedrock presents problems when cutting and filling is required.

Planting Severe seedling survival due to shallow rooting depth and low available water holding capacity. Reduced rooting depth restricts tree growth and increases windthrow hazards.

Site Preparation Hard bedrock at shallow depths may interfere with equipment operation.

Slope Erosion is a hazard when slopes exceed 15 percent. On steep slopes, traction problems increase. Track type equipment or yarding with cables may be necessary.

Management: Site index values are generally less than 50. Productivity is low. Limited woodland management opportunities exist. Eastern red cedar production may be possible. These sites can be valuable for wildlife purposes and watershed protection.

Trees to Plant: Eastern red cedar

WOODLAND SUITABILITY GROUPS
2-4 D3

Dry forest communities found on gentle to moderately steep mid and upper slopes of hills and plains. Soils are moderately well drained to well drained. A dense fragipan is present within 24 inches of the surface. Slopes range from 1 to 35 percent. Soil depths exceed 60 inches. Also includes moderately deep (20 to 40 inches) fine-loamy soils developed from weathered sandstone.

Vegetation: Oak-hickory and oak-pine forests with white oak, black oak, post oak, pignut hickory, chinquapin oak, and eastern red cedar. In southern sections of the Ozarks, shortleaf pine and scarlet oak occur.

Soil Series:	Bolivar	Scholten	Agnos
	Hoberg	Paintbrush	
	Hobson	Tonti	
	Lebanon	Viraton	
	Nixa	Wilderness	

Limitations: Restricted rooting depth (fragipan); slope

Interpretations:

Equipment Use No major restrictions or limitations exist.

Planting Moderate seedling mortality during low rainfall periods due to restricted rooting depth and low available water capacity.

Site Preparation Disturbing the surface excessively during site preparation activities increases soil losses, which may leave coarse fragments on the surface.

Slope Erosion is a hazard when slopes exceed 15 percent. On steep slopes, traction problems increase. Track type equipment or yarding with cables may be necessary.

Management: Site index values range from 40 to 60. Woodland management opportunities are fair to good. These groups respond well to even-aged management. Restrict clear cuttings to less than 30 acres or group selection cuttings of 2 to 5 acres. Favor oaks on higher productivity sites and pines and cedars on lower productivity sites.

Trees to Plant: White oak
Black oak
Shortleaf pine (south)
Eastern red cedar.

WOODLAND SUITABILITY GROUPS
2-3 D4

Flatwood forest communities found on level or nearly level plains, ridges, and small plateaus. Soils are somewhat poorly drained with an impermeable or slowly permeable subsurface layer (fragipan) below 24 inches. Perched water tables occur from 1 to 3 feet. Slopes range from 0 to 5 percent. Soil depths exceed 60 inches.

Vegetation: Oak flatwood communities with post oak, blackjack oak, black oak, white oak, shortleaf pine, and black hickory.

Soil Series: Celt
Needleye
Plato

Limitations: Restricted rooting depth (fragipan); seasonal wetness.
Interpretations:

Equipment No major limitations or restrictions. Avoid wet Use periods of the year.

Plantings Seedling survival can be improved by providing shade or mulching.
Reduced rooting depth restricts tree growth and increases windthrow hazards.

Site Disturbing the surface excessively during site
Preparation preparation activities increases soil losses, which may leave coarse fragments on the surface.

Management: Site index values range from 40 to 60. Management opportunities are fair to good. This group responds well to even-aged management. Restrict clear cuttings to less than 30 acres or group selection cuttings of 2 to 5 acres. Favor black oak, white oak, and pin oak on better sites.

Trees to Plant: Black oak
Shortleaf pine (south)
White oak

WOODLAND SUITABILITY GROUPS
3-4 D5

Dry-mesic forest communities on deep (>60 inches), gentle to moderately steep upper and mid-slopes of hills and ridges, and old stream terraces. Soils are moderately well drained with an impermeable or slowly permeable subsurface layer (fragipan) below 24 inches. Perched water tables occur from 2 to 3 feet. Slopes range from 1 to 20 percent.

Vegetation: Oak-hickory, mixed deciduous, or oak-pine forests with white oak, post oak, northern red oak, black oak, shagbark hickory, and mockernut hickory. In the southern Ozark region, shortleaf pine and black gum may be present.

Soil Series: Captina
Nicholson

Limitations: Restricted rooting depth (fragipan).

Interpretations:

Equipment Use No major limitations or restrictions.

Planting Reduced rooting depth restricts tree growth and increases windthrow hazards.

Site Preparation No major limitations or restrictions.

Management: Site index values range from 55 to 74. Woodland management opportunities are good. These groups respond well to even-aged management. Restrict clearcuttings to less than 30 acres or group selection cuttings of 2 to 5 acres. Favor white oak and northern red oak on higher productivity sites and black oak and pines on lower productivity sites.

Trees to Plant: White oak
Black oak
Northern red oak
Shortleaf pine (south)
White pine
Scarlet oak (south)

WOODLAND SUITABILITY GROUPS
2-3 C3

Dry forest communities found on moderately deep (20 to 40 inches) gentle to steep upper and mid-slopes of hills and ridges. Clay content in the upper layers of the soil profile frequently exceed 50 percent. Soils are well drained to moderately well drained. Slopes ranges from 0 to 60 percent. Soils with clay contents of 60 percent and higher and with deeper profiles (> 40 inches) are also included.

Vegetation: Oak-hickory forests with white oak, black oak, post oak, pignut hickory, chinquapin oak, and eastern red cedar. In southern sections of the Ozarks, shortleaf pine and scarlet oak occur.

Soil Series: Bardley Swiss Gossport
Beemont Vanmeter
Chilhowie Snead

Limitations: Clay content in upper portion of soil profile; slope

Interpretations:

Equipment Use Clayey soils have reduced traction and compact easily when wet. Unsurfaced roads and skid trails may be impassable during rainy periods. Restrict activities to dry periods or surfaced areas.

Planting Seedling mortality will be high during the summer because of lack of adequate soil moisture, especially on south facing slopes.

Site Preparation The use of equipment is restricted in spring and other wet periods. The surface layer is firm when dry and sticky when wet and becomes cloddy if tilled.

Slope Erosion is a hazard when slopes exceed 15 percent. On steep slopes, traction problems increase. Track type equipment or yarding with cables may be necessary.

Management: Site index values range from 40 to 60. Woodland mangement opportunities are fair to good. These groups respond well to even-aged managment. Restrict clear cuttings to less than 30 acres or group selection cuttings of 2 to 5 acres. Favor oaks on higher productivity sites and pines and cedars on lower productivity sites.

Trees to Plant: White oak Eastern redcedar
Black oak
Shortleaf pine

WOODLAND SUITABILITY GROUPS
3-7 C5

Dry-mesic forest communities on deep (>60 inches), gentle to moderately steep upper and mid-slopes of hills, ridges, and plains. Clay content in upper profile ranges from 35 to 60 percent. Soils are somewhat poorly drained to well drained. Perched water tables are common. Slopes range from 0 to 30 percent.

Vegetation: Oak-hickory, mixed deciduous, or oak-pine forests with white oak, northern red oak, black oak, shagbark hickory, mockernut hickory, and sugar maple. In the southern Ozark region, shortleaf pine and black gum are common associates.

Soil Series:	Armstrong	Keswick	Bevier
	Brevator	Lowell	Rinda
	Calwoods	Pershing	Clarksfork
	Caneyville	Shadygrove	Cotton
	Gorin	Vertrees	
	Hatton	Weller	

Limitations: Clay in upper portion of soil profile; slope

Interpretations:

Equipment Use Clayey soils have reduced traction and compact easily when wet. Unsurfaced roads and skid trails may be impassable during rainy periods. Restrict activities to dry periods or surfaced areas.

Planting Seedling mortality will be high during the summer because of lack of adequate soil moisture, especially on south facing slopes.

Site Preparation The use of equipment is restricted in spring and other wet periods. The surface layer is firm when dry and sticky when wet and becomes cloddy if tilled.

Slope Erosion is a hazard when slopes exceed 15 percent. On steep slopes, traction problems increase. Track type equipment or yarding with cables may be necessary.

Management: Site index values range from 55 to 74. Woodland management opportunities are good. These groups respond well to even-aged management. Restrict clearcuttings to less than 30 acres or group selection cuttings of 2 to 5 acres. Favor white oak and northern red oak on higher productivity sites and black oak and pines on lower productivity sites.

Trees to Plant:	White oak	Scarlet oak (south)
	Black oak	White pine
	Northern red oak	

WOODLAND SUITABILITY GROUPS
3-7 C7

Wet-mesic forest communities found on alluvial sediments of low terraces and floodplains. Clay content in the upper soil profile ranges from 35 to 70 percent. Soils are somewhat poorly drained to moderately well drained. None to occasional flooding with very brief to brief durations. Slopes range from 0 to 5 percent. Water tables are within 1 to 4 feet of the surface during the spring.

Vegetation: Mixed deciduous forests with swamp white oak, pin oak, green ash, cottonwood, pecan, shellbark hickory, and sycamore. In the southeastern region, cherrybark oak, overcup oak, and bald cypress are common associates.

Soil Series:	Chase	Onawa
	Cooter	Nameoki
	Hartville	Parkville
	Hurst	Waldron
	Leta	

Limitations: Clay in upper portion of soil profile; seasonal wetness.

Interpretations:

<u>Equipment Use</u>	Clayey soils have reduced traction and compact easily when wet. Unsurfaced roads and skid trails may be impassable during rainy periods. Restrict activities to dry periods or surfaced areas.
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<u>Planting</u>	Seedling mortality may be high during the summer because of lack of adequate soil moisture.
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<u>Site Preparation</u>	The use of equipment is restricted in spring and other wet periods. The surface layer is firm when dry and sticky when wet and becomes cloddy if tilled.
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Management: Site index values may exceed 90. Woodland management opportunities are good. This group responds well to both even-aged and uneven-aged management. Restrict cuttings to small group cuttings of 1 to 2 acres, single tree selections, or clear cuttings of less than 30 acres. Harvest methods that leave some mature trees to provide shade and soil protection may be desirable. Maintain adequate riparian buffer strips.

Trees to Plant:	Black oak
	Sweetgum
	Cottonwood
	Pin oak
	Southern red oak (south)
	Loblolly pine (south)
	Sweetgum

WOODLAND SUITABILITY GROUPS
3-4 S3

Dry forest communities found on very deep sands associated with broad old natural levees, hummocky ridges of natural levees, and low hills of outwash plains or coastal plain sediments above bottomlands. Soils are excessively drained with rapid permeability. Soil fertility and available water capacity are very low. Slopes range from 0 to 50 percent.

Vegetation: Oak-hickory forests with white oak, black oak, post oak, hickory, southern red oak, and blackjack oak.

Soil Series: Plainfield
Eutis
Scotco

Limitations: Sand, low available water capacity and low fertility.

Interpretations:

<u>Equipment Use</u>	The loose sandy upper layer hinders the use of wheeled equipment especially when the soil is saturated or very dry.
<u>Planting</u>	Severe seedling mortality may occur because of lack of adequate soil moisture. Soil blowing may damage seedlings and young trees.
<u>Site Preparation</u>	Clear-cutting timber or removing the understory increases the risk of wind erosion.
<u>Slope</u>	Erosion is a hazard when slopes exceed 15 percent. On steep slopes, traction problems increase. Track type equipment or yarding with cables may be necessary.

Management: Site index values range from 40 to 70. Woodland management opportunities are fair. Harvest methods that leave some mature trees to provide shade and soil protection may be desirable. Restrict cuttings to group selection cuttings of 2 to 5 acres or single tree selections.

Trees to Plant: Black oak
Shortleaf pine (south)
Eastern red cedar
Red pine

WOODLAND SUITABILITY GROUPS
3-8 S5

Dry-mesic forest communities found on sandy alluvial sediments of natural terraces, and floodplains along major rivers. None to occasional flooding with very brief to brief durations. Soils are excessively drained. Slopes range from 0 to 5 percent. Fertility and available water capacity are low.

Vegetation: Oak-hickory and mixed deciduous forests with white oak, hickory, black oak, and sugar maple. In the southern Ozark region, black gum, southern red oak, and sweetgum may be associates.

Soil Series:	Crevasse	Perks
	Malden	
	Sarpy	
	Wideman	

Limitations: Sand, low available water capacity and low fertility.

Interpretations:

<u>Equipment Use</u>	The loose sandy upper layer hinders the use of wheeled equipment especially when the soil is saturated or very dry.
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<u>Planting</u>	High seedling mortality may occur because of lack of adequate soil moisture. Soil blowing may damage seedlings and young trees.
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<u>Site Preparation</u>	Clear-cutting timber increases the risk of wind erosion.
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Management: Site index values range from 40 to 70. Woodland management opportunities are fair. Harvest methods that leave some mature trees to provide shade and soil protection may be desirable. Restrict cuttings to group selection cuttings of 2 to 5 acres or single tree selections.

Trees to Plant: Black oak
Sweetgum
Southern red oak (south)
Shortleaf pine (south)

WOODLAND SUITABILITY GROUPS
4-11 S6

Mesic forest communities found on sandy alluvium on natural levees, terraces, and undulating floodplains. Soils are well drained to excessively drained. Flooding none to occasional with very brief to long durations. Soil fertility and available water capacity low to moderate. Slopes range from 0 to 8 percent.

Vegetation: Mixed deciduous forests with white oak, red oak, sycamore, bur oak, cottonwood, and ash. In southern Ozark region southern red oak, sweetgum, and may be associates.

Soil Series: Broseley
Beulah
Hodge
Sarpy (flooded)
Towosahgy

Limitations: Sand

Interpretations:

Equipment Use The loose sandy upper layer hinders the use of wheeled equipment especially when the soil is saturated or very dry.

Planting Seedling mortality may occur because of lack of adequate soil moisture.
Soil blowing may damage seedlings and young trees.

Site Preparation Clear-cutting timber increases the risk of wind erosion.

Management: Site index values range may exceed 80. Woodland management opportunities are fair to good. Harvest methods that leave some mature trees to provide shade and soil protection may be desirable. Restrict cuttings to group selection cuttings of 2 to 5 acres or single tree selections. Maintain adequate riparian buffer strips.

Trees to Plant: Black oak
Sweetgum
Southern red oak (south)
Shortleaf pine (south)
Cottonwood

WOODLAND SUITABILITY GROUPS
4-8 S7

Wet-mesic forest communities found on sands or sands over clays/loams associated with natural levees, terraces, and floodplains. Soils are moderately well drained. Flooding is rare to occasional with brief durations. High water tables are present from January to June, occurring at 2 to 3 feet. Soil depths exceed 60 inches. Slopes range from 0 to 5 percent.

Vegetation: Mixed deciduous forests with cottonwood, pin oak, sycamore, shortleaf pine, green ash, and sweetgum.

Soil Series: Canalow
Clana
Kenmoor
Silverdale
Steele

Limitations: Sand

Interpretations:

Equipment Use The loose sandy upper layer hinders the use of wheeled equipment especially when the soil is saturated or very dry.

Planting Seedling mortality may occur because of lack of adequate soil moisture during the summer months. Soil blowing may damage seedlings and young trees.

Site Preparation Clear-cutting timber increases the risk of wind erosion.

Management: Site index values may exceed 90. Woodland management opportunities are good. This group responds well to both even-aged and uneven-aged management. Restrict cuttings to small group cuttings of 1 to 2 acres, single tree selections, or clear cuttings of less than 30 acres. Harvest methods that leave some mature trees to provide shade and soil protection may be desirable. Maintain adequate riparian buffer strips.

Trees to Plant: Black oak
Sweetgum
Cottonwood
Pin oak
Southern red oak (south)
Shortleaf pine (south)
Loblolly pine (south)

WOODLAND SUITABILITY GROUPS
2-5 F3

Dry forest communities found on moderately steep mid and upper slopes of hills, plains, crests of bluffs, and steep walled valleys or canyons. More common on south and west aspects. Soils are well drained to excessively drained. Slopes range from 2 to 60 percent. Soil depths are moderately deep to very deep (>60 inches). Soil profiles contain large amounts of gravels, cobbles, or flagstones.

Vegetation: Oak-hickory and oak-pine forests with white oak, black oak, post oak, pignut hickory, chinquapin oak, and eastern red cedar. In southern sections of the Ozarks, shortleaf pine and scarlet oak occur.

Soil Series: Bender Bendavis
 Hailey Roseland

Limitations: Large amounts of coarse fragments, less than 10 inches, throughout profile; slope

Interpretations:

Equipment Use Disturbing the surface excessively in harvesting timber and building roads increases soil losses, which leaves a greater amount of coarse fragments on the surface.

Planting Coarse profile material will make planting difficult. Hand planting may be necessary.

Low moisture holding capacity increases seedling mortality. Mulching, providing shade, or adding supplemental water can improve seedling survival.

Site Preparation Disturbing the surface excessively during site preparation activities increases soil losses, which leaves a greater amount of coarse fragments on the surface.

Slope Erosion is a hazard when slopes exceed 15 percent. On steep slopes, traction problems increase. Track type equipment or yarding with cables may be necessary.

Management: Site index values range from 40 to 60. Woodland management opportunities are fair to good. These groups respond well to even-aged management. Restrict clear cuttings to less than 30 acres or group selection cuttings of 2 to 5 acres. Favor oaks on higher productivity sites and pines and cedars on lower productivity sites.

Trees to Plant: White oak Eastern red cedar
 Black oak Shortleaf pine

WOODLAND SUITABILITY GROUPS
3-6 F5

Dry-mesic forest communities found on gentle to steep upper and mid-slopes of hills, ridges, plains, and colluvium. More common on north and east aspects. The soils are moderately well drained to somewhat excessively drained. Slopes range from 1 to 70 percent. Soil depths generally exceed 60 inches. Soil profiles contain large amounts of gravels, cobbles, or flagstones.

Vegetation: Oak-hickory, mixed deciduous, or oak-pine forests with white oak, northern red oak, black oak, shagbark hickory, mockernut hickory, and sugar maple. In the southern Ozark region, shortleaf pine and black gum are common associates.

Soil Series:

Brussels	Mano	Noark	Saffel
Clarksville	Ocie	Rueter	Goss
Coulstone	Poyner		

Limitations: Large amounts of coarse fragments, less than 10 inches, throughout profile; slope

Interpretations:

Equipment Use Disturbing the surface excessively in harvesting timber and building roads increases soil losses, which leaves a greater amount of coarse fragments on the surface.

Planting Coarse profile material will make planting difficult. Hand planting may be necessary.

Low moisture holding capacity increases seedling mortality. Mulching, providing shade, or adding supplemental water can improve seedling survival.

Site Preparation Disturbing the surface excessively during site preparation activities increases soil losses, which leaves a greater amount of coarse fragments on the surface.

Slope Erosion is a hazard when slopes exceed 15 percent. On steep slopes, traction problems increase. Track type equipment or yarding with cables may be necessary.

Management: Site index values range from 55 to 74. Woodland management opportunities are good. These groups respond well to even-aged management. Restrict clearcuttings to less than 30 acres or group selection cuttings of 2 to 5 acres. Favor white oak and northern red oak on higher productivity sites and black oak and pines on lower productivity sites.

Trees to Plant:

White oak	Shortleaf pine
Black oak	Northern red oak

WOODLAND SUITABILITY GROUPS
3-4 F6

Mesic forest communities found on small floodplains, narrow terraces, alluvial and colluvial fans, and toe slopes of mountain highlands. Soils are well drained to somewhat excessively drained. Slopes range from 0 to 9 percent. Rare to occasional flooding with very brief durations. Soil profiles contain large amounts of gravels, cobbles, or flagstones.

Vegetation: Mixed deciduous forests with northern red oak, white oak, black walnut, and ash. Shortleaf pine, cherrybark oak, shumard oak, and sweetgum may occur in the southern Ozarks region.

Soil Series: Bloomsdale Midco
Cedargap Waben
Hercules

Limitations: Large amounts of coarse fragments, less than 10 inches, throughout profile.

Interpretations:

Equipment Use Disturbing the surface excessively in harvesting timber and building roads increases soil losses, which leaves a greater amount of coarse fragments on the surface.

Planting Coarse profile material will make planting difficult. Hand planting may be necessary.

Low moisture holding capacity increases seedling mortality. Mulching, providing shade, or adding supplemental water can improve seedling survival.

Site Preparation Disturbing the surface excessively during site preparation activities increases soil losses, which leaves a greater amount of coarse fragments on the surface.

Management: Site index values may exceed 75. These groups respond well to both even-aged and uneven-aged management. Restrict cuttings to small group cuttings of 1 to 2 acres, single-tree selections, or clear cuttings of less than 30 acres. Favor white oak, northern red oak, black walnut, and cherrybark oak. Shade tolerant understory species may need to be controlled during regeneration activities. Maintain adequate riparian buffer strips.

Trees to Plant: White oak Shumard oak (south)
 Northern red oak Shortleaf pine
 Black walnut
 Cherrybark oak (south)

WOODLAND SUITABILITY GROUPS
8F7

Wet-mesic forest communities found along creeks and small streams that drain highly dissected uplands. Soils are well drained to somewhat excessively drained. Occasional flooding with brief durations. Slopes range from 0 to 5 percent. Silt loam surface layer with large amounts of gravels or cobbles lower in soil profile.

Vegetation: Mixed deciduous forests with white oak, cottonwood, sycamore, green ash, and sweetgum.

Soil Series: Elsah

Limitations: Large amounts of coarse fragments, less than 10 inches, in subsurface profile.

Interpretations:

Equipment Use Disturbing the surface excessively in harvesting timber and building roads increases soil losses, which may leave coarse fragments on the surface. Restrict activities during brief flooding periods.

Planting Low moisture holding capacity may increase seedling mortality.

Site Preparation Disturbing the surface excessively during site preparation activities increases soil losses, which may leave coarse fragments on the surface.

Management: Site index values may exceed 90. This group responds well to both even-aged and uneven-aged management. Restrict cuttings to small group cuttings of 1 to 2 acres, single tree selections, or clear cuttings of less than 30 acres. Favor white oak, cherrybark oak, black walnut, sycamore, and cottonwood. Maintain adequate riparian buffer strips.

Trees to Plant:	Cottonwood	Sycamore
	Pin oak	Black walnut
	Green ash	Cherrybark oak (south)

WOODLAND SUITABILITY GROUPS
2-3 A3

Dry forest communities found on moderately deep (20 to 40 inches), gentle to steep upper and mid-slopes of hills and ridges. Soils are moderately well drained to well drained. Slopes ranges from 1 to 60 percent. Soils with fragipans generally deeper than 30 inches and coarse-silty, somewhat excessively drained, deep loess soils are also included.

Vegetation: Oak-hickory forests with white oak, black oak, post oak, pignut hickory, chinquapin oak, and eastern red cedar. In southern sections of the Ozarks, shortleaf pine and scarlet oak occur.

Soil Series:	Delassus	Loring	Reger
	Hamburg	Mandeville	Cabool
	Hildebrecht	Rosendale	
	Knobtop	Union	
	Lily	Viburnum	

Limitations: None (see slope exception).

Interpretations:

Equipment Use No major restrictions or limitations exist.

Planting No major restrictions or limitations exist.

Site Preparation No major restrictions or limitations exist.

Slope Erosion is a hazard when slopes exceed 15 percent. On steep slopes, traction problems increase. Track type equipment or yarding with cables may be necessary.

Management: Site index values range from 40 to 55. Woodland mangement opportunities are fair to good. These groups respond well to even-aged managment. Restrict clear cuttings to less than 30 acres or group selection cuttings of 2 to 5 acres. Favor oaks on higher productivity sites and pines and cedars on lower porductivity sites.

Trees to Plant: White oak
Black oak
Shortleaf pine (south)
Eastern red cedar.

WOODLAND SUITABILITY GROUPS
3-8 A5

Dry-mesic forest communities on deep (>40 inches) to very deep, gentle to moderately steep upper and mid-slopes of hills and ridges, and outwash plains. Soils are moderately well drained to well drained. Slopes range from 0 to 50 percent.

Vegetation: Oak-hickory, mixed deciduous, or oak-pine forests with white oak, northern red oak, black oak, shagbark hickory, mockernut hickory, and sugar maple. In the southern Ozark region, shortleaf pine and black gum are common associates.

Soil Series:	Alsup	Clinton	Lineville	Portia
	Alvin	Courtois	Macedonia	Bunceton
	Armster	Crider	Minnith	Timula
	Baxter	Doniphan	Pembroke	
	Bluelick	Gepp	Peridge	
	Brandon	Gara	Purdin	
	Britwater	Gunlock	Smithdale	
	Bronaugh	Jonca	Winnegan	
	Bucklick	Lenzburg	Bahner	
	Claiborne	Lindley	Newcomer	

Limitations: None (see slope exception).

Interpretations:

Equipment Use No major limitations or restrictions.

Planting No major limitations or restrictions.

Site Preparation No major limitations or restrictions.

Slope Erosion is a hazard when slopes exceed 15 percent. On steep slopes, traction problems increase. Track type equipment or yarding with cables may be necessary.

Management: Site index values range from 55 to 70. Woodland management opportunities are good. These groups respond well to even-aged management. Restrict clearcuttings to less than 30 acres or group selection cuttings of 2 to 5 acres. Favor white oak and northern red oak on higher productivity sites and black oak and pines on lower productivity sites.

Trees to Plant:	White oak	Scarlet oak (south)
	Black oak	White pine
	Northern red oak	

WOODLAND SUITABILITY GROUPS
3-8 A6

Mesic forest communities found on small floodplains, narrow terraces, colluvial footslopes, and loess deposits on gentle to steep slopes of hills and crests of river bluffs. Soils are moderately well drained to well drained. Slopes range from 0 to 40 percent. None to occasional flooding with very brief to brief durations.

Vegetation: Mixed deciduous forests with northern red oak, white oak, black walnut, hackberry, burr oak, and ash. Shortleaf pine, cherrybark oak, shumard oak, and sweetgum may occur in the southern Ozarks region.

Soil Series:	Baylis	Kaintuck	Pope	Ackmore
	Brandon	Kickapoo	Racket	Floris
	Branson	Knox	Razort	Lecoma
	Fourche	Ladoga	Secesh	Koszta
	Haymond	Lamotte	Sensabaugh	Sewannee
	Holstein	Lindside	Weingarten	Jemerson
	Huntington	Memphis	Winfield	
	Iva	Menfro	Mystic	

Limitations: None (see slope exception).

Interpretations:

Equipment Use No major limitations or restrictions.

Planting No major limitations or restrictions.

Site Preparation No major limitations or restrictions.

Slope Erosion is a hazard when slopes exceed 15 percent. On steep slopes, traction problems increase. Track type equipment or yarding with cables may be necessary.

Management: Site index values may exceed 75. These groups respond well to both even-aged and uneven-aged management. Restrict cuttings to small group cuttings of 1 to 2 acres, single-tree selections, or clear cuttings of less than 30 acres. Favor white oak, northern red oak, black walnut, and cherrybark oak. Shade tolerant understory species may need to be controlled during regeneration activities. Maintain adequate riparian buffer strips.

Trees to Plant:	White oak	Cherrybark oak (south)
	Northern red oak	Shumard oak (south)
	Black walnut	

WOODLAND SUITABILITY GROUPS
3-13 A7

Wet-mesic forest communities found along natural levees, terraces, and level to gently sloping bottomlands. Soils are somewhat poorly drained to well drained. Soils are intermittently wet for very brief to brief periods. None to occasional flooding. Slopes range from 0 to 12 percent.

Vegetation: Mixed deciduous forests with white oak, bur oak, green ash, black walnut, cottonwood, pecan, hackberry, shellbark hickory, and sycamore. In the southeastern region, cherrybark oak and shumard oak are associates.

Soil Series:	Ashton	Farrenburg	Reelfoot
	Belknap	Fatima	Ross
	Blake	Gilliam	Sharon
	Bosket	Gladden	Tina
	Carr	Haynie	Tiptonville
	Caruthersville	Hepler	Verdigris
	Collins	Kampville	Wakeland
	Commerce	Kennebec	Westerville
	Cotter	Landes	Wilbur
	Dameron	Lilbourn	Klum
	Diehlstadt	McPaul	Motark
	Dockery	Nodaway	
	Dubbs	Nolin	
	Elk	Norborne	
	Eudora	Radley	

Limitations: None

Interpretations:

Equipment Use No major limitations or restrictions.

Planting No major limitations or restrictions.

Site Preparation No major limitations or restrictions.

Management: Site index values may exceed 90. Woodland management opportunities are good. This group responds well to both even-aged and uneven-aged management. Restrict cuttings to small group cuttings of 1 to 2 acres, single tree selections, or clear cuttings of less than 30 acres. Maintain adequate riparian buffer strips.

Trees to Plant:	White oak	Pecan
	Black walnut	Cottonwood
	Red oak	Green ash
	Cherrybark oak (south)	
	Loblolly pine (south)	